

In the Claims:

- Sub 4*
1. (Currently amended) A method of producing polymer foam, comprising:
heating a polymer resin to a melt temperature therefor;
selecting at least one blowing agent consisting of at least one ambient gas;
combining the heated polymer resin with the at least one blowing agent to
create a mixture; and

extruding polymer foam from the mixture comparable in quality to that
obtainable with hydrocarbon blowing agents, the polymer foam having a specific
gravity of less than about 0.15 g/cc.
 2. (Original) The method of claim 1, wherein the extruding comprises guiding
the mixture through an exiting channel to an exit with a cross-sectional area larger than at
least one point within the exiting channel.
 3. (Original) The method of claim 2, wherein the cross-sectional area of the exit
is at least about twice as large as that of the at least one point.
 4. (Original) The method of claim 2, wherein the extruding further comprises
reducing friction within at least a portion of the exiting channel.
 5. (Original) The method of claim 4, wherein the exiting channel comprises a
first portion from an entrance to a point having a smallest cross-sectional area and a second
portion from the point having the smallest cross-sectional area to the exit, and wherein the
reducing comprises controlling a temperature of the second portion.
 6. (Original) The method of claim 5, wherein the controlling comprises keeping
the second portion at a temperature of between about 15° Celsius and about 95° Celsius.
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7. (Original) The method of claim 6, wherein the keeping comprises keeping the second portion at a temperature of between about 25° Celsius and about 60° Celsius.
8. (Original) The method of claim 5, further comprising at least partially thermally isolating the first portion from the second portion.
9. (Original) The method of claim 8, wherein the at least partially thermally isolating comprises locating at least one air gap between the first portion and the second portion.
10. (Original) The method of claim 4, wherein the reducing comprises coating the at least a portion of the exiting channel with a friction-reducing substance.
11. (Original) The method of claim 10, wherein the coating comprises coating the at least a portion of the exiting channel with titanium nitride.
12. (Original) The method of claim 10, wherein the coating comprises coating the at least a portion of the exiting channel with tungsten carbon carbide.
13. (Original) The method of claim 10, wherein the coating comprises coating the at least a portion of the exiting channel with a composite comprising nickel and one of tetrafluoroethylene fluorocarbon polymer and fluorinated ethylene-propylene.
14. (Original) The method of claim 1, wherein selecting the at least one blowing agent comprises selecting from among carbon dioxide, nitrogen and argon.
15. (Original) The method of claim 1, wherein the extruding comprises extruding polymer foam from the mixture having a specific gravity of between about 0.05 g/cc and about 0.15 g/cc and an average cell diameter of about 0.05 mm to about 1 mm.

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16. (Original) The method of claim 15, wherein the extruding comprises extruding polymer foam sheet from the mixture having a thickness of between about 0.75 mm and about 6 mm.

17. (Original) The method of claim 16, wherein the extruding comprises extruding polymer foam sheet from the mixture having less than about 5% gauge variation across a width thereof.

18-43. (Cancelled)

44. (New) The method of claim 1, wherein the polymer resin comprises polystyrene.

45. (New) A method of producing polymer foam, comprising:

heating a polymer resin to a melt temperature therefor;

selecting at least one blowing agent consisting of at least one ambient gas;

combining the heated polymer resin with the at least one blowing agent to create a mixture;

extruding polymer foam from the mixture comparable in quality to that obtainable with hydrocarbon blowing agents, comprising guiding the mixture through an exiting channel comprising a first portion and a second portion; and

at least partially thermally isolating the first portion from the second portion prior to the extruding.

46. (New) The method of claim 45, wherein the guiding comprises guiding the mixture through the exiting channel to an exit with a cross-sectional area larger than at least one point within the exiting channel.

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47. (New) The method of claim 46, wherein the cross-sectional area of the exit is at least about twice as large as that of the at least one point.

48. (New) The method of claim 46, wherein the extruding further comprises reducing friction within at least a portion of the exiting channel.

49. (New) The method of claim 48, wherein the first portion spans from an entrance to a point having a smallest cross-sectional area and the second portion spans from the point having the smallest cross-sectional area to the exit, and wherein the reducing comprises controlling a temperature of the second portion.

50. (New) The method of claim 49, wherein the controlling comprises keeping the second portion at a temperature of between about 15° Celsius and about 95° Celsius.

51. (New) The method of claim 50, wherein the keeping comprises keeping the second portion at a temperature of between about 25° Celsius and about 60° Celsius.

52. (New) The method of claim 49, wherein the reducing comprises coating the at least a portion of the exiting channel with a friction-reducing substance.

53. (New) The method of claim 52, wherein the coating comprises coating the at least a portion of the exiting channel with titanium nitride.

54. (New) The method of claim 52, wherein the coating comprises coating the at least a portion of the exiting channel with tungsten carbon carbide.

55. (New) The method of claim 52, wherein the coating comprises coating the at least a portion of the exiting channel with a composite comprising nickel and one of tetrafluoroethylene fluorocarbon polymer and fluorinated ethylene-propylene.

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56. (New) The method of claim 45, wherein the at least partially thermally isolating comprises locating at least one air gap between the first portion and the second portion.

57. (New) The method of claim 45, wherein selecting the at least one blowing agent comprises selecting from among carbon dioxide, nitrogen and argon.

58. (New) The method of claim 45, wherein the extruding comprising extruding polymer foam from the mixture having a specific gravity of less than about 0.15 g/cc.

59. (New) The method of claim 58, wherein the extruding comprises extruding polymer foam from the mixture having a specific gravity of between about 0.05 g/cc and about 0.15 g/cc and an average cell diameter of about 0.05 mm to about 1 mm.

60. (New) The method of claim 59, wherein the extruding comprises extruding polymer foam sheet from the mixture having a thickness of between about 0.75 mm and about 6 mm.

61. (New) The method of claim 60, wherein the extruding comprises extruding polymer foam sheet from the mixture having less than about 5% gauge variation across a width thereof.

62. (New) The method of claim 45, wherein the polymer resin comprises polystyrene.